

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-2. Cancelled.

3. (previously presented) A method for controlling automatic range shift decisions in selecting an appropriate range from at least two possible ranges in a manually shifted, multiple-ratio vehicular transmission system, each range having a plurality of ratios, the method comprising:

detecting an intent to shift signal;

determining a set of potential target gear ratios, in response to detecting the intent to shift signal;

executing engine overspeed tests to verify at least one of the set of potential target gear ratios;

determining an appropriate range based on operating variables including the target gear ratio verified by the engine overspeed tests;

executing an automatic range shift to select the determined range based in part on the target gear ratio when the target gear ratio is not in a current range; and

determining if the vehicle speed is above a low speed latch; and if the vehicle speed is above the low speed latch, controlling an automatic range shift, otherwise shifting the transmission system into low range.

4-7. Cancelled.

8. (previously presented) A method for controlling automatic range shift decisions in selecting an appropriate range from at least two possible ranges in a manually shifted, multiple-ratio vehicular transmission system, each range having a plurality of ratios, the method comprising:

detecting a set of transmission system criteria, the set of transmission system criteria including a vehicle speed, a shift lever rail position, a transition to rail position, a shift knob force, a shift knob force direction, and a position of a splitter select switch;

detecting an operator's intent to shift signal based on the shift knob force and the shift knob force direction;

determining a set of potential target gear ratios based on the shift lever rail position, the position of the splitter select switch, and the shift knob force direction;

executing an engine overspeed test to select one ratio from the set of potential target gear ratios based on the set of transmission system criteria, in response to the detection of the operator's intent to shift signal;

determining an appropriate range based on the system criteria and selected target gear ratio verified by the engine overspeed test; and

initiating an automatic range shift for selecting the determined range based on the system criteria and the selected target gear ratio when the target gear ratio is not in a current range;

the determination of an appropriate range comprising determining if the vehicle speed is above a low speed latch; and if the vehicle speed is above the low speed latch, executing automatic range shift decisions, otherwise shifting the transmission system into low range.

9. (previously presented) A method for controlling automatic range shift decisions in selecting an appropriate range from at least two possible ranges in a manually shifted vehicular transmission system, the method comprising:

detecting a set of transmission system criteria, the set of transmission system criteria including a vehicle speed, a shift lever rail position, a transition to rail position, a shift knob force, a shift knob force direction, and a position of a splitter select switch;

detecting an operator's intent to shift signal based on the shift knob force and the shift knob force direction;

determining a set of potential target gear ratios based on the shift lever rail position, the position of the splitter select switch, and the shift knob force direction;

executing an engine overspeed test to select one ratio from the set of potential target gear ratios based on the set of transmission system criteria, in response to the detection of the operator's intent to shift signal;

determining an appropriate range based on the selected target gear ratio verified by the engine overspeed test; and

initiating an automatic range shift for selecting the determined range based on the selected target gear ratio;

the step of determining the appropriate range comprising shifting the transmission system into high range if a) the shift lever is on low rail or if a transition to low rail is detected and the shift lever position is in neutral, and b) the transmission system is in low range and the engine overspeed test indicates a positive result.

10. (previously presented) A method for controlling automatic range shift decisions in selecting an appropriate range from at least two possible ranges in a manually shifted vehicular transmission system, the method comprising:

detecting a set of transmission system criteria, the set of transmission system criteria including a vehicle speed, a shift lever rail position, a transition to rail position, a shift knob force, a shift knob force direction, and a position of a splitter select switch;

detecting an operator's intent to shift signal based on the shift knob force and the shift knob force direction;

determining a set of potential target gear ratios based on the shift lever rail position, the position of the splitter select switch, and the shift knob force direction;

executing an engine overspeed test to select one ratio from the set of potential target gear ratios based on the set of transmission system criteria, in response to the detection of the operator's intent to shift signal;

determining an appropriate range based on the selected target gear ratio verified by the engine overspeed test; and

initiating an automatic range shift for selecting the determined range based on the selected target gear ratio;

the step of determining an appropriate range comprising shifting the transmission system into low range if a) the shift lever is on low rail or if the transition to low

rail is detected and the shift lever position is in neutral, and b) the transmission system is in high range and the engine overspeed test indicates a negative result.

11. (previously presented) A method for controlling automatic range shift decisions in selecting an appropriate range from at least two possible ranges in a manually shifted vehicular transmission system, the method comprising:

detecting a set of transmission system criteria, the set of transmission system criteria including a vehicle speed, a shift lever rail position, a transition to rail position, a shift knob force, a shift knob force direction, and a position of a splitter select switch;

detecting an operator's intent to shift signal based on the shift knob force and the shift knob force direction;

determining a set of potential target gear ratios based on the shift lever rail position, the position of the splitter select switch, and the shift knob force direction;

executing an engine overspeed test to select one ratio from the set of potential target gear ratios based on the set of transmission system criteria, in response to the detection of the operator's intent to shift signal;

determining an appropriate range based on the selected target gear ratio verified by the engine overspeed test; and

initiating an automatic range shift for selecting the determined range based on the selected target gear ratio;

the step of determining the appropriate range further comprising shifting the transmission system into low range if a) the shift lever is on low rail or if a transition to low rail is detected and the shift lever position is in neutral, and b) the range is unknown and the engine overspeed test indicates a negative result, otherwise shifting the transmission system into high range.

12. (previously presented) A method for controlling automatic range shift decisions in selecting an appropriate range from at least two possible ranges in a manually shifted vehicular transmission system, the method comprising:

detecting a set of transmission system criteria, the set of transmission system criteria including a vehicle speed, a shift lever rail position, a transition to rail position, a shift knob force, a shift knob force direction, and a position of a splitter select switch;

detecting an operator's intent to shift signal based on the shift knob force and the shift knob force direction;

determining a set of potential target gear ratios based on the shift lever rail position, the position of the splitter select switch, and the shift knob force direction;

executing an engine overspeed test to select one ratio from the set of potential target gear ratios based on the set of transmission system criteria, in response to the detection of the operator's intent to shift signal;

determining an appropriate range based on the selected target gear ratio verified by the engine overspeed test;

the at least two possible ranges including a low range and a high range; and

detecting a splitter select switch position; and if the transmission system is in low range and a) the splitter select switch indicates a splitter low position and the engine overspeed test for a first gear ratio indicates a positive result, or b) the splitter select switch indicates a high position and the engine overspeed test for a second gear indicates a positive result, then shifting the transmission system into high range.

13. (previously presented) A method for controlling automatic range shift decisions in selecting an appropriate range from at least two possible ranges in a manually shifted vehicular transmission system, the method comprising:

detecting a set of transmission system criteria, the set of transmission system criteria including a vehicle speed, a shift lever rail position, a transition to rail position, a shift knob force, a shift knob force direction, and a position of a splitter select switch;

detecting an operator's intent to shift signal based on the shift knob force and the shift knob force direction;

determining a set of potential target gear ratios based on the shift lever rail position, the position of the splitter select switch, and the shift knob force direction;

executing an engine overspeed test to select one ratio from the set of potential target gear ratios based on the set of transmission system criteria, in response to the detection of the operator's intent to shift signal;

determining an appropriate range based on the selected target gear ratio verified by the engine overspeed test;

initiating an automatic range shift for selecting the determined range based on the selected target gear ratio;

the at least two possible ranges including a low range and a high range; and

detecting a splitter select switch position; and if the transmission is in high range and a) the splitter select switch indicates a splitter low position and the engine overspeed test for a first gear ratio indicates a negative result, or b) the splitter select switch indicates a splitter high position and the engine overspeed test for a second gear ratio indicates a negative result, then shifting the transmission system into low range.

14. (previously presented) A method for controlling automatic range shift decisions in selecting an appropriate range from at least two possible ranges in a manually shifted vehicular transmission, the method comprising:

detecting a set of transmission system criteria, the set of transmission system criteria including a vehicle speed, a shift lever rail position, a transition to rail position, a shift knob force, a shift knob force direction, and a position of a splitter select switch;

detecting an operator's intent to shift signal based on the shift knob force and the shift knob force direction;

determining a set of potential target gear ratios based on the shift lever rail position, the position of the splitter select switch, and the shift knob force direction;

executing an engine overspeed test to select one ratio from the set of potential target gear ratios based on the set of transmission system criteria, in response to the detection of the operator's intent to shift signal;

determining an appropriate range based on the selected target gear ratio verified by the engine overspeed test;

initiating an automatic range shift for selecting the determined range based on the selected target gear ratio;

the at least two possible ranges including a low range and a high range; and detecting a splitter select switch position; and if the range state is unknown and a) the splitter select switch indicates a splitter low position and the engine overspeed test for a first gear ratio indicates a negative result, or b) the splitter select switch indicates a splitter high position and the engine overspeed test for a second gear ratio indicates a negative result, then shifting the transmission system into low range, otherwise shifting the transmission system into high range.

15. (previously presented) A method for controlling automatic range shift decisions in selecting an appropriate range from at least two possible ranges in a manually shifted vehicular transmission system, the method comprising:

detecting a set of transmission system criteria, the set of transmission system criteria including a vehicle speed, a shift lever rail position, a transition to rail position, a shift knob force, a shift knob force direction, and a position of a splitter select switch;

detecting an operator's intent to shift signal based on the shift knob force and the shift knob force direction;

determining a set of potential target gear ratios based on the shift lever rail position, the position of the splitter select switch, and the shift knob force direction;

executing an engine overspeed test to select one ratio from the set of potential target gear ratios based on the set of transmission system criteria, in response to the detection of the operator's intent to shift signal;

determining an appropriate range based on the selected target gear ratio verified by the engine overspeed test; and

initiating an automatic range shift for selecting the determined range based on the selected target gear ratio;

the step of determining the appropriate range comprising shifting the transmission system into low range if a) the shift lever is on high rail or if a transition to high rail is detected and the shift position is in neutral, and b) the transmission system is in high range and the engine overspeed test indicates a negative result.

16. (previously presented) A method for controlling automatic range shift decisions in selecting an appropriate range from at least two possible ranges in a manually shifted vehicular transmission system, the method comprising:

detecting a set of transmission system criteria, the set of transmission system criteria including a vehicle speed, a shift lever rail position, a transition to rail position, a shift knob force, a shift knob force direction, and a position of a splitter select switch;

detecting an operator's intent to shift signal based on the shift knob force and the shift knob force direction;

determining a set of potential target gear ratios based on the shift lever rail position, the position of the splitter select switch, and the shift knob force direction;

executing an engine overspeed test to select one ratio from the set of potential target gear ratios based on the set of transmission system criteria, in response to the detection of the operator's intent to shift signal;

determining an appropriate range based on the selected target gear ratio verified by the engine overspeed test; and

initiating an automatic range shift for selecting the determined range based on the selected target gear ratio;

the step of determining the appropriate range comprising maintaining the transmission system in low range if a) the shift lever is on high rail or if a transition to high rail is detected and the shift position is in neutral, and b) the transmission system is currently in low range.

17. (previously presented) A method for controlling automatic range shift decisions in selecting an appropriate range from at least two possible ranges in a manually shifted vehicular transmission system, the method comprising:

detecting a set of transmission system criteria, the set of transmission system criteria including a vehicle speed, a shift lever rail position, a transition to rail position, a shift knob force, a shift knob force direction, and a position of a splitter select switch;

detecting an operator's intent to shift signal based on the shift knob force and the shift knob force direction;

determining a set of potential target gear ratios based on the shift lever rail position, the position of the splitter select switch, and the shift knob force direction;

executing an engine overspeed test to select one ratio from the set of potential target gear ratios based on the set of transmission system criteria, in response to the detection of the operator's intent to shift signal;

determining an appropriate range based on the selected target gear ratio verified by the engine overspeed test; and

initiating an automatic range shift for selecting the determined range based on the selected target gear ratio;

the step of determining the appropriate range state further comprising shifting the transmission system into low range if a) the shift lever is on high rail or if a transition to high rail is detected and the shift position is in neutral, and b) the current range state is unknown and the engine overspeed test indicates a negative result, otherwise shifting the transmission system into high range.

18-20. Cancelled.

21. (previously presented) A manually shifted compound transmission system comprising:

a manually operated shift lever;

a position sensor for providing a position signal indicative of a position of the shift lever;

a force threshold detector for providing a shift knob force signal indicative of forces applied to the shift lever in a longitudinal direction;

a splitter select switch for engaging a selected splitter ratio and for providing a signal indicative thereof;

a speed sensor for providing signals indicative of engine rotational speed;

a controller including control logic for receiving input signals from the position sensor, the force threshold sensor, the splitter select switch, and the speed sensor to formulate an intent to shift signal and to determine a set of potential target gear ratios, the control logic executing engine overspeed tests to verify at least one of the set of potential target gear ratios,

and automatically determining an appropriate one of a low range and a high range of the transmission system based on the selected target gear ratio; and

a range shift mechanism for shifting the transmission system into the appropriate range automatically determined by the control logic;

the speed signal being operable to indicate whether the vehicle is operating above a low speed latch; and means for controlling automatic range shift determinations if the vehicle speed is above the low speed latch and for shifting the transmission into low range if the vehicle speed is lower than the low speed latch.

22. Cancelled.

23. (previously presented) A manually shifted compound transmission system comprising:

a manually operated shift lever;

a position sensor for providing a position signal indicative of a position of the shift lever;

a force threshold detector for providing a shift knob force signal indicative of forces applied to the shift lever in a longitudinal direction;

a splitter select switch for engaging a selected splitter ratio and for providing a signal indicative thereof;

a speed sensor for providing signals indicative of engine rotational speed;

a controller including control logic for receiving input signals from the position sensor, the force threshold sensor, the splitter select switch, and the speed sensor to formulate an intent to shift signal and to determine a set of potential target gear ratios, the control logic executing engine overspeed tests to verify at least one of the set of potential target gear ratios, and automatically determining an appropriate one of a low range and a high range of the transmission system based on the selected target gear ratio; and

a range shift mechanism for shifting the transmission system into the appropriate range automatically determined by the control logic;

the position signal being operable to indicate a transition to one of at least two possible rail positions including high rail and low rail;

the determination of the appropriate range of the transmission system by the controller comprising shifting the transmission system into high range if a) the shift lever is on low rail or if the position signal indicates a transition to low rail and the shift lever position is in neutral, and b) the transmission system is in low range and an overspeed test indicates a positive result.

24. (previously presented) A manually shifted compound transmission system comprising:

- a manually operated shift lever;
- a position sensor for providing a position signal indicative of a position of the shift lever;
- a force threshold detector for providing a shift knob force signal indicative of forces applied to the shift lever in a longitudinal direction;
- a splitter select switch for engaging a selected splitter ratio and for providing a signal indicative thereof;
- a speed sensor for providing signals indicative of engine rotational speed;
- a controller including control logic for receiving input signals from the position sensor, the force threshold sensor, the splitter select switch, and the speed sensor to formulate an intent to shift signal and to determine a set of potential target gear ratios, the control logic executing engine overspeed tests to verify at least one of the set of potential target gear ratios, and automatically determining an appropriate one of a low range and a high range of the transmission system based on the selected target gear ratio; and
- a range shift mechanism for shifting the transmission system into the appropriate range automatically determined by the control logic;
- the position signal being operable to indicate a transition to one of at least two possible rail positions including high rail and low rail;
- the determination of the appropriate range by the controller comprising shifting the transmission system into low range if a) the shift lever is on low rail or if the position signal indicates a transition to low rail and the shift lever position is in neutral, and b) the transmission system is in high range and the overspeed test indicates a negative result.

25. (previously presented) A manually shifted compound transmission system comprising:

- a manually operated shift lever;
- a position sensor for providing a position signal indicative of a position of the shift lever;
- a force threshold detector for providing a shift knob force signal indicative of forces applied to the shift lever in a longitudinal direction;
- a splitter select switch for engaging a selected splitter ratio and for providing a signal indicative thereof;
- a speed sensor for providing signals indicative of engine rotational speed;
- a controller including control logic for receiving input signals from the position sensor, the force threshold sensor, the splitter select switch, and the speed sensor to formulate an intent to shift signal and to determine a set of potential target gear ratios, the control logic executing engine overspeed tests to verify at least one of the set of potential target gear ratios, and automatically determining an appropriate one of a low range and a high range of the transmission system based on the selected target gear ratio; and
- a range shift mechanism for shifting the transmission system into the appropriate range automatically determined by the control logic;
- the position signal being operable to indicate a transition to one of at least two possible rail positions including high rail and low rail;
- the determination of the appropriate range by the controller comprising shifting the transmission system into low range if a) the shift lever is on low rail or if a transition to low rail is detected and the shift lever position is in neutral, and b) the range is unknown and the overspeed test indicates a negative result, otherwise shifting the transmission system into high range.

26. (previously presented) A manually shifted compound transmission system comprising:

- a manually operated shift lever;
- a position sensor for providing a position signal indicative of a position of the shift lever;

a force threshold detector for providing a shift knob force signal indicative of forces applied to the shift lever in a longitudinal direction;

a splitter select switch for engaging a selected splitter ratio and for providing a signal indicative thereof;

a speed sensor for providing signals indicative of engine rotational speed;

a controller including control logic for receiving input signals from the position sensor, the force threshold sensor, the splitter select switch, and the speed sensor to formulate an intent to shift signal and to determine a set of potential target gear ratios, the control logic executing engine overspeed tests to verify at least one of the set of potential target gear ratios, and automatically determining an appropriate one of a low range and a high range of the transmission system based on the selected target gear ratio;

a range shift mechanism for shifting the transmission system into the appropriate range automatically determined by the control logic;

the position signal being operable to indicate a transition to one of at least two possible rail positions including high rail and low rail;

the at least two possible ranges comprising a low range and a high range; and

means for detecting a splitter select switch position; and if the transmission system is in low range and a) the splitter select switch indicates a splitter low position and the engine overspeed test for a first gear ratio is true, or b) the splitter select switch indicates a splitter high position and the engine overspeed test for a second gear ratio is true, then shifting the transmission system into high range.

27. (currently amended) A manually shifted compound transmission system comprising:

a manually operated shift lever;

a position sensor for providing a position signal indicative of a position of the shift lever;

a force threshold detector for providing a shift knob force signal indicative of forces applied to the shift lever in a longitudinal direction;

a splitter select switch for engaging a selected splitter ratio and for providing a signal indicative thereof;

a speed sensor for providing signals indicative of engine rotational speed;

a controller including control logic for receiving input signals from the position sensor, the force threshold sensor, the splitter select switch, and the speed sensor to formulate an intent to shift signal and to determine a set of potential target gear ratios, the control logic executing engine overspeed tests to verify at least one of the set of potential target gear ratios, and automatically determining an appropriate one of a low range and a high range of the transmission system based on the selected target gear ratio;

the at least two possible range states comprising a low range and a high range;
and

means for detecting a splitter select switch position; and if the transmission system is in high range and a) the splitter select switch indicates a splitter low position and a gear an engine overspeed test for a first gear ratio is false, or b) the splitter select switch indicates a splitter high position and the engine overspeed test for a second gear ratio is false, then shifting the transmission system into low range.

28. (currently amended) A manually shifted compound transmission system comprising:

a manually operated shift lever;

a position sensor for providing a position signal indicative of a position of the shift lever;

a force threshold detector for providing a shift knob force signal indicative of forces applied to the shift lever in a longitudinal direction;

a splitter select switch for engaging a selected splitter ratio and for providing a signal indicative thereof;

a speed sensor for providing signals indicative of engine rotational speed;

a controller including control logic for receiving input signals from the position sensor, the force threshold sensor, the splitter select switch, and the speed sensor to formulate an intent to shift signal and to determine a set of potential target gear ratios, the control logic executing engine overspeed tests to verify at least one of the set of potential target gear ratios, and automatically determining an appropriate one of a low range and a high range of the transmission system based on the selected target gear ratio; and

a range shift mechanism for shifting the transmission system into the appropriate range automatically determined by the control logic;

the at least two possible range states comprising a low range and a high range;
and

means for detecting a splitter select switch position; and if the state is unknown and a) the splitter select switch indicates a splitter low position and ~~a gear~~ an engine overspeed test for a first gear ratio is false, or b) the splitter select switch indicates a splitter high position and the engine overspeed test for a second gear ratio is false, then shifting the transmission system into low range, otherwise shifting the transmission system into high range.

29. (previously presented) A manually shifted compound transmission system comprising:

a manually operated shift lever;

a position sensor for providing a position signal indicative of a position of the shift lever;

a force threshold detector for providing a shift knob force signal indicative of forces applied to the shift lever in a longitudinal direction;

a splitter select switch for engaging a selected splitter ratio and for providing a signal indicative thereof;

a speed sensor for providing signals indicative of engine rotational speed;

a controller including control logic for receiving input signals from the position sensor, the force threshold sensor, the splitter select switch, and the speed sensor to formulate an intent to shift signal and to determine a set of potential target gear ratios, the control logic executing engine overspeed tests to verify at least one of the set of potential target gear ratios, and automatically determining an appropriate one of a low range and a high range of the transmission system based on the selected target gear ratio; and

a range shift mechanism for shifting the transmission system into the appropriate range automatically determined by the control logic;

the position signal being operable to indicate a transition to one of at least two possible rail positions including high rail and low rail;

the determination of the appropriate range comprising shifting the transmission system into low range if a) the shift lever is on high rail or if the position signal indicates a transition to high rail and the shift position is in neutral, and b) the transmission system is in high range and the overspeed test indicates a negative result.

30. (previously presented) A manually shifted compound transmission system comprising:

- a manually operated shift lever;

- a position sensor for providing a position signal indicative of a position of the shift lever;

- a force threshold detector for providing a shift knob force signal indicative of forces applied to the shift lever in a longitudinal direction;

- a splitter select switch for engaging a selected splitter ratio and for providing a signal indicative thereof;

- a speed sensor for providing signals indicative of engine rotational speed;

- a controller including control logic for receiving input signals from the position sensor, the force threshold sensor, the splitter select switch, and the speed sensor to formulate an intent to shift signal and to determine a set of potential target gear ratios, the control logic executing engine overspeed tests to verify at least one of the set of potential target gear ratios, and automatically determining an appropriate one of a low range and a high range of the transmission system based on the selected target gear ratio; and

- a range shift mechanism for shifting the transmission system into the appropriate range automatically determined by the control logic;

- the position signal being operable to indicate a transition to one of at least two possible rail positions including high rail and low rail;

- the determination of the appropriate range comprising maintaining a transmission system in low range if a) the shift lever is on high rail or if the position signal indicates a transition to high rail and the shift position is in neutral, and b) the transmission system is currently in low range, then maintaining the transmission in low range.

31. (previously presented) A manually shifted compound transmission system comprising:

a manually operated shift lever;

a position sensor for providing a position signal indicative of a position of the shift lever;

a force threshold detector for providing a shift knob force signal indicative of forces applied to the shift lever in a longitudinal direction;

a splitter select switch for engaging a selected splitter ratio and for providing a signal indicative thereof;

a speed sensor for providing signals indicative of engine rotational speed;

a controller including control logic for receiving input signals from the position sensor, the force threshold sensor, the splitter select switch, and the speed sensor to formulate an intent to shift signal and to determine a set of potential target gear ratios, the control logic executing engine overspeed tests to verify at least one of the set of potential target gear ratios, and automatically determining an appropriate one of a low range and a high range of the transmission system based on the selected target gear ratio; and

a range shift mechanism for shifting the transmission system into the appropriate range automatically determined by the control logic;

the position signal being operable to indicate a transition to one of at least two possible rail positions including high rail and low rail;

the determination of the appropriate range comprising shifting the transmission system into low range if a) the shift lever is on high rail or if the position signal indicates a transition to high rail and the shift position is in neutral, and b) the current range state is unknown and the overspeed test indicates a negative result, otherwise shifting the transmission system into high range.